

## B. Claim Listing

The following listing of the claims replaces all prior versions and listings of the claims in the application.

1. (Currently Amended) A method for making a mode decision in video coding, comprising:

collecting a first portion of video data;

labeling the first portion of video data with an optimal mode;

identifying at least one feature of the first portion of video data corresponding to the optimal mode, wherein identifying the at least one feature includes:

defining at least one training feature vector and its cost relating to a unit of the first portion of video data; and

defining a training feature space containing the feature vector;

constructing a probabilistic model based on the at least one identified feature;

and

making a mode decision for a second portion of the video data based on an application of the probabilistic model to the second portion of the video.

2. (Original) The method of claim 1, wherein collecting a first portion of video data includes collecting a sample of the video data.

3. (Currently Amended) The method of claim 1, wherein identifying ~~[[a]]~~ the at least one feature of the first portion of video data corresponding to the optimal mode further includes~~[[:]]~~

~~defining at least one training feature vector and its cost relating to a unit of the first portion of video data;~~

~~defining a training feature space containing the feature vector; and~~

~~partitioning the feature space.~~

4. (Currently Amended) The method of claim 3, wherein identifying ~~[[a]]~~ the at least one feature of the ~~first portion of video data corresponding to the optimal mode~~ further includes transforming the feature space.

5. (Previously Presented) The method of claim 1, wherein making a mode decision for a second portion of the video data based on an application of the probabilistic model to the second portion of the video includes:

calculating a likelihood ratio for a unit of the second portion of the video using a value of the feature;

selecting a hypothesis for the unit that is believed to be true; and

making the mode decision based on the selected hypothesis.

6. (Original) The method of claim 1, wherein the mode decision is selected from the group consisting of an intra-/inter-mode decision and a frame skip/code decision.

7. (Original) A method of coding a sequence of video, comprising:
- extracting at least one sample unit of the video;
  - defining at least one training feature vector and an associated cost with the vector for the sample unit;
  - defining a training feature space associated with the feature vector;
  - transforming the feature space;
  - constructing a probabilistic model for the feature space;
  - calculating a likelihood ratio for a second unit of the video;
  - selecting a hypothesis that is believed to be true for the second unit of the video;
  - making a mode decision based on the selected hypothesis; and
  - coding the second unit of the video using the mode decision.
8. (Original) The method of claim 7, wherein the associated cost is associated with the mode decision.
9. (Original) The method of claim 7, wherein the mode decision is selected from the group consisting of an intra-/inter-mode decision, a frame type selection decision, and a frame skip/code decision.
10. (Original) The method of claim 7, wherein defining a training feature space associated with the feature vector includes associating the training feature vector with a hypothesis that is true for the training feature vector.

11. (Original) The method of claim 7, wherein transforming the feature space includes replacing the training feature vector with a plurality of vectors having no height.
12. (Original) The method of claim 7, wherein constructing a probabilistic model for the feature space includes constructing a Gaussian model for the feature space using an expectation maximization algorithm.
13. (Original) The method of claim 7, wherein selecting a hypothesis that is believed to be true for the second unit of the video includes selecting a hypothesis for which a likelihood ratio associated with the second unit of the video exceeds a threshold.
14. (Original) The method of claim 7, wherein making a mode decision based on the selected hypothesis includes making a first mode decision when the selected hypothesis is true and making a second mode decision when another hypothesis is true.
15. (Currently Amended) A video coding system, comprising:
  - a video encoder, the video encoder for:
    - collecting a first portion of video data;
    - labeling the first portion of video data with an optimal mode;
    - identifying at least one feature of the first portion of video datacorresponding to the optimal mode, wherein identifying the at least one feature includes:
  - defining at least one training feature vector and its cost relating to a
  - unit of the first portion of video data; and

defining a training feature space containing the feature vector;  
constructing a probabilistic model based on the at least one identified  
feature; and  
making a mode decision for a second portion of the video data based on  
an application of the probabilistic model to the second portion of the video; and  
a video decoder in communication with the video encoder.

16. (Currently Amended) A video encoder including a set of instructions which, when  
executed by the encoder, cause the encoder to:

collect a first portion of video data;  
label the first portion of video data with an optimal mode;  
identify at least one feature of the first portion of video data corresponding to the  
optimal mode, wherein causing the encoder to identify the at least one feature includes  
causing the encoder to:

define at least one training feature vector and its cost relating to a unit of  
the first portion of video data; and

define a training feature space containing the feature vector;  
construct a probabilistic model based on the at least one identified feature; and  
make a mode decision for a second portion of the video data based on an  
application of the probabilistic model to the second portion of the video.

17. (Original) The encoder of claim 16, wherein the mode decision is selected from the group consisting of an intra-/inter-mode decision, a frame type selection decision, and a frame skip/code decision.

18. (Currently Amended) An apparatus, comprising:

means for collecting a first portion of video data;

means for labeling the first portion of video data with an optimal mode;

means for identifying at least one feature of the first portion of video data corresponding to the optimal mode, wherein means for identifying the at least one feature include:

means for defining at least one training feature vector and its cost relating to a unit of the first portion of video data; and

means for defining a training feature space containing the feature vector;

means for constructing a probabilistic model based on the at least one identified feature; and

means for making a mode decision for a second portion of the video data based on an application of the probabilistic model to the second portion of the video.

19. (Original) An apparatus, comprising:

means for extracting at least one sample unit of a sequence of video;

means for defining at least one training feature vector and an associated cost with the vector for the sample unit;

means for defining a training feature space associated with the feature vector;

means for transforming the feature space;

means for constructing a probabilistic model for the feature space;

means for calculating a likelihood ratio for a second unit of the video;

means for selecting a hypothesis that is believed to be true for the second unit of the video;

means for making a mode decision based on the selected hypothesis; and

means for coding the second unit of the video using the mode decision.

20. (Original) A method of coding a sequence of video, comprising:

extracting at least one sample unit of the video;

defining at least one training feature vector and an associated cost with the vector for the sample unit;

defining a training feature space associated with the feature vector;

transforming the feature space;

constructing a probabilistic model for the feature space;

partitioning the feature space into a plurality of regions;

selecting a hypothesis that is believed to be true for the second unit of the video;

making a mode decision based on the selected hypothesis; and

coding the second unit of the video using the mode decision.